IN THE CLAIMS:

Please AMEND claims 1, 3, 5, 6, 12, 13, 19, 22 and 23, and ADD new claims 26-37, as follows. For the Examiner's convenience, all claims currently pending in this application have been reproduced below:

1. (Currently Amended) An exposure apparatus ~~having a projection optical system for projecting a pattern formed on a master onto a substrate, a stage capable of moving with respect to the projection optical system while holding at least either object of the substrate and master, and a lens barrel support which supports the projection optical system, including~~ comprising:

a projection optical system which projects a pattern formed on a master onto a substrate;

a lens barrel support which supports the projection optical system;

a stage capable of moving with respect to the projection optical system while holding at least one of the substrate and master;

a Z measuring mirror which is arranged on the stage and has a reflecting surface substantially parallel to an XY plane; and

an interferometer system having an interferometer for measuring a Z position and displacement of the stage with respect to the lens barrel support by using [[a]] the reflecting surface of said Z measuring mirror ~~which is arranged on the stage and has a reflecting surface substantially parallel to an XY plane~~.

2. (Original) The apparatus according to claim 1, wherein said interferometer system includes a plurality of interferometer systems arranged on the apparatus.

3. (Currently Amended) The apparatus according to claim [[1]] 2, wherein a tilt amount of the stage is measured using measurement results of said plurality of interferometer systems.

4. (Original) The apparatus according to claim 1, wherein said interferometer system includes a plurality of interferometer systems arranged on the apparatus over the projection optical system.

5. (Currently Amended) The apparatus according to claim [[1]] 2, wherein said interferometers in said interferometer systems have overlapping measurable regions, and when the stage is positioned in a region where the measurable regions overlap each other, measurement by said interferometer is switched.

6. (Currently Amended) The apparatus according to claim [[1]] 2, wherein the apparatus further comprises control means for correcting a position and displacement on the basis of measurement results of the position and displacement by said interferometer systems, and measurement values of said plurality of interferometers are synchronously received and sent to said control means.

7. (Original) The apparatus according to claim 1, wherein the interferometer is mounted on at least either of the stage and a movable portion which follows the stage, the stage has an elongated mirror for Z measurement which is longer in a stroke direction of the movable portion which supports the interferometer, and the elongated mirror for Z measurement uses an upper surface of either of X and Y measuring mirrors.

8. (Original) The apparatus according to claim 1, wherein said interferometer system causes measurement light emitted by the interferometer to strike the Z measuring mirror via a plurality of mirrors or prisms attached to the lens barrel support serving as a measurement reference.

9. (Original) The apparatus according to claim 1, wherein measurement light from said interferometer system is substantially perpendicularly incident on the reflecting surface of the Z measuring mirror.

10. (Original) The apparatus according to claim 1, wherein the interferometer emits a total of four beams including two measurement beams and two reference beams, and the four beams are formed with a cross-shaped positional relationship at a substantially equal interval.

11. (Original) The apparatus according to claim 1, wherein a mirror or prism arranged immediately in front of the Z measuring mirror has at least two reflecting surfaces for reflecting measurement light to the Z measuring mirror and reference light back to an incident optical path.

12. (Currently Amended) An exposure apparatus comprising:

a Y stage movable in a Y direction;

an X stage movable in an X direction with respect to said Y stage;

a Z mirror which is mounted on said X stage or Y stage and has a reflecting surface parallel to an XY plane;

a mirror or prism for guiding to said Z mirror a beam emitted to a Z direction by said Y stage; and

an interferometer for detecting a Z position of said X stage or Y stage by using the beam reflected by the reflecting surface of said Z mirror.

13. (Currently Amended) The apparatus according to claim 12, wherein said interferometer is mounted on said Y stage or said X stage.

14. (Original) The apparatus according to claim 12, wherein said interferometer is mounted in the X or Y direction, the apparatus further comprises an optical element having a reflecting surface for reflecting a beam from the X or Y direction to the Z direction, and said interferometer emits a beam parallel to the X or Y direction toward said optical element.

15. (Original) The apparatus according to claim 12, wherein said mirror or prism for guiding the beam to said Z mirror has a first mirror or prism for reflecting to the X or Y direction a beam emitted to the Z direction by said Y stage or X stage, and a second mirror or prism for reflecting to the Z direction the beam reflected by the first mirror or prism and irradiating said Z mirror with the beam.

16. (Original) The apparatus according to claim 15, wherein the first mirror or prism and the second mirror or prism are elongated in the X or Y direction.

17. (Original) The apparatus according to claim 15, wherein the second mirror or prism has a reflecting surface for reflecting to the first mirror or prism a reference light component of the beam reflected by the first mirror or prism.

18. (Original) The apparatus according to claim 1, wherein a plurality of interferometers in said interferometer system have overlapping measurable regions when a central position of the stage is controlled to be near an exposure center.

19. (Currently Amended) A semiconductor device manufacturing method comprising the steps of:

installing a plurality of semiconductor manufacturing apparatuses including an exposure apparatus in a factory; and

manufacturing a semiconductor device by using the plurality of semiconductor manufacturing apparatuses,

wherein the exposure apparatus ~~has a projection optical system for projecting a pattern formed onto a master to a substrate, a stage capable of moving with respect to the projection optical system while holding at least either object of the substrate and master, and a lens barrel support which supports the projection optical system, and~~ comprises:

a projection optical system which projects a pattern formed on a master onto a substrate;

a lens barrel support which supports the projection optical system;

a stage capable of moving with respect to the projection optical system while holding at least one of the substrate and master;

a Z measuring mirror which is arranged on the stage and has a reflecting surface substantially parallel to an XY plane; and

~~the exposure apparatus includes an interferometer system having~~ an interferometer for measuring a Z position and displacement of the stage with respect to the lens barrel support by using [[a]] the reflecting surface of Z measuring mirror ~~which is arranged on the stage and has a reflecting surface substantially parallel to an XY plane~~.

20. (Original) The method according to claim 19, further comprising the steps of:

connecting the plurality of semiconductor manufacturing apparatuses to a local area network;

connecting the local area network to an external network outside the semiconductor manufacturing factory;

acquiring information about the exposure apparatus from a database on the external network by using the local area network and the external network; and

controlling the exposure apparatus on the basis of the acquired information.

21. (Original) The method according to claim 20, wherein a database provided by a vendor or user of the exposure apparatus is accessed via the external network, thereby obtaining maintenance information of the manufacturing apparatus by data communication, or data communication is performed between the semiconductor manufacturing factory and another semiconductor manufacturing factory via the external network, thereby performing production management.

22. (Currently Amended) A semiconductor manufacturing factory comprising:

a plurality of semiconductor manufacturing apparatuses including an exposure apparatus;

a local area network for connecting said plurality of semiconductor manufacturing apparatuses; and

a gateway for connecting said local area network to an external network outside the semiconductor manufacturing factory,

wherein information about at least one of said plurality of semiconductor manufacturing apparatuses can be communicated,

said exposure apparatus ~~has a projection optical system for projecting a pattern formed on a master onto a substrate, a stage capable of moving with respect to the projection optical system while holding at least either object of the substrate and mater, and a lens barrel support which supports the projection optical system, and~~ comprising:

a projection optical system which projects a pattern formed on a master onto a substrate;

a lens barrel support which supports the projection optical system;

a stage capable of moving with respect to the projection optical system while holding at least one of the substrate and master;

a Z measuring mirror which is arranged on the stage and has a reflecting surface substantially parallel to an XY plane; and

~~said exposure apparatus includes an interferometer system having~~ an interferometer for measuring a Z position and displacement of the stage with respect to the lens barrel support by using [[a]] the reflecting surface of said Z measuring mirror ~~which is arranged on the stage and has a reflecting surface substantially parallel to an XY plane~~.

23. (Currently Amended) A maintenance method for an exposure apparatus installed in a semiconductor manufacturing factory, comprising the steps of:

preparing a database for accumulating information about maintenance of the exposure apparatus on an external network outside a factory where the exposure apparatus is installed;

connecting the exposure apparatus to a local area network in the factory; and

maintaining the exposure apparatus on the basis of information accumulated in the database by using the external network and the local area network;

wherein the exposure apparatus ~~has a projection optical system for projecting a pattern formed on a master onto a substrate, a stage capable of moving with respect to the projection optical system while holding at least either object of the substrate and master, and a lens barrel which supports the projection optical system, and~~ comprises:

a projection optical system which projects a pattern formed on a master onto a substrate;

a lens barrel support which supports the projection optical system;

a stage capable of moving with respect to the projection optical system while holding at least one of the substrate and master;

a Z measuring mirror which is arranged on the stage and has a reflecting surface substantially parallel to an XY plane; and

~~the exposure apparatus includes an interferometer system having~~ an interferometer for measuring a Z position and displacement of the stage with respect to the lens barrel support by using [[a]] the reflecting surface of said Z measuring mirror ~~which is arranged on the stage and has a reflecting surface substantially parallel to an XY plane~~.

24. (Original) The apparatus according to claim 1, further comprising:

an interface for connecting a network;

a computer for executing network software for communicating maintenance information of the exposure apparatus via the network; and

a display for displaying the maintenance information of the exposure apparatus that is communicated by the network software executed by said computer.

25. (Original) The apparatus according to claim 24, wherein the network software provides on said display a user interface for accessing a maintenance database which is provided by a vendor or user of the exposure apparatus and connected to the external network outside a factory where the exposure apparatus is installed, and enables obtaining information from the database via the external network.

26. (New) An exposure apparatus comprising:

a projection lens ;

a barrel support which supports the said projection lens;

a stage capable of moving along an XY plane with a reflecting surface substantially parallel to the XY plane; and

an Interferometer used to search for information which indicates a position of a Z direction of said stage to said barrel support using light reflected in said reflecting surface.

27. (New) The apparatus according to claim 26, wherein the stage has a mirror that makes the reflecting surface substantially parallel to the XY plane.

28. (New) The apparatus according to claim 27. wherein a different surface from the reflecting surface of the mirror is used in order to search for Information which indicates a position of a direction along the XY plane of the stage.

29. (New) The apparatus according to claim 26, wherein the stage has a Y stage capable of moving in a Y direction, and an X stage capable moving in an X direction to said Y stage while supporting a substrate on which a pattern is projected through the projection lens, wherein the X stage has the reflecting surface.

30. (New) The apparatus according to claim 29,

wherein the barrel support has a first optical element, and

wherein a light reflected in the reflecting surface reaches a second optical element which moves with the Y stage, after being reflected with said first optical element.

31. (New) The apparatus according to claim 30, wherein the second optical element has a guide element to guide light reached to said second optical element into the interferometer.

32. (New) An exposure apparatus includes:

a projection lens;

a barrel support which supports said projection lens;

a Y stage capable of moving In a Y direction;

an X stage capable of moving in an X direction to said Y stage while supporting a substrate on which a pattern Is projected through said projection lens;

a Z mirror which has a substantially parallel reflecting surface in an XY plane, wherein said Z mirror moves with said X stage; and

a Z interferometer used to search for Information which indicates a position of a Z direction of said X stage to said barrel support using light

reflected in the reflecting surface of said Z mirror.

33. (New) The apparatus according to claim 32,

wherein the stage has a Y mirror and an X mirror,

wherein said apparatus further includes a Y interferometer used to search for information which indicates a position of the Y direction of the X stage using light reflected in a reflecting surface of said Y mirror, and an X interferometer used to search for information which indicates a position of the X direction of the X stage using light reflected from a reflecting surface of said X mirror.

34. (New) The apparatus according to claim 33. wherein the Z mirror is disposed as one body in an upper surface of an element in which the Y mirror is disposed.

35. (New) The apparatus according to claim 34,

wherein the barrel support has a first optical element,

wherein a light reflected in the reflecting surface reaches a second optical element which moves with the Y stage, after being reflected with said first optical element.

36. (New) The apparatus according to claim 35, wherein the second optical element has a guide element to guide light reached to said second optical element into the Z interferometer.

37. (New) The apparatus according to claim 36,

wherein the first optical element has a plurality of reflective elements extending in the Y direction,

wherein a light reflected by the Z mirror reaches to the second optical element after passing through said plurality of reflective elements.